Social cognitive atypicalities associated with preterm birth: a challenge to the early diagnosis of autism

Social Cognitive Atypicalities Associated with Pre-term Birth

A challenge to the early diagnosis of autism

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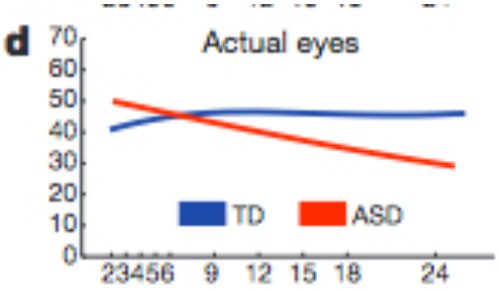
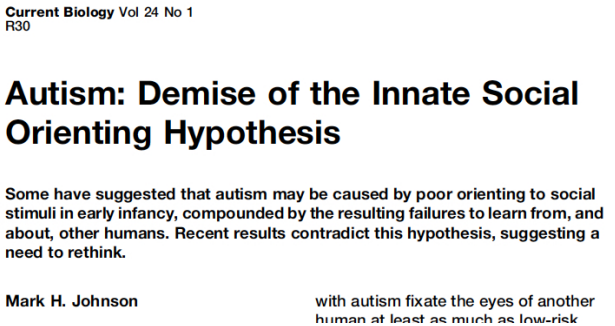
The Patrick Wild Centre

Early autism research

- Focus on ASD-siblings with typical control group
- Early features of autism remain unclear and / or complex at best
- Social cognitive differences in infancy seem particularly elusive



Jones & Klin, 2013, *Nature*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Autism: Demise of the Innate Social Orienting Hypothesis

Some have suggested that autism may be caused by poor orienting to social stimuli in early infancy, compounded by the resulting failures to learn from, and about, other humans. Recent results contradict this hypothesis, suggesting a need to rethink.

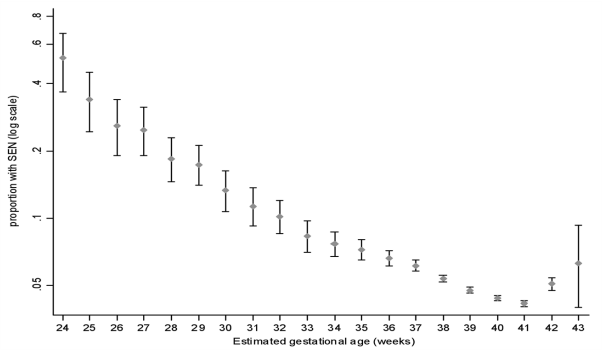
Mark H. Johnson

with autism fixate the eyes of another human at least as much as low-risk

Johnson, 2014, *Current Biology*

Preterm birth

- Prevalent in 5 - 13% of live births globally
- Associated with ≈4 times increased risk for ASD
- Approximately 50% of infants born very preterm go on to have cognitive and behavioural difficulties



MacKay et al, 2010, *PLoS Medicine*

Study goals

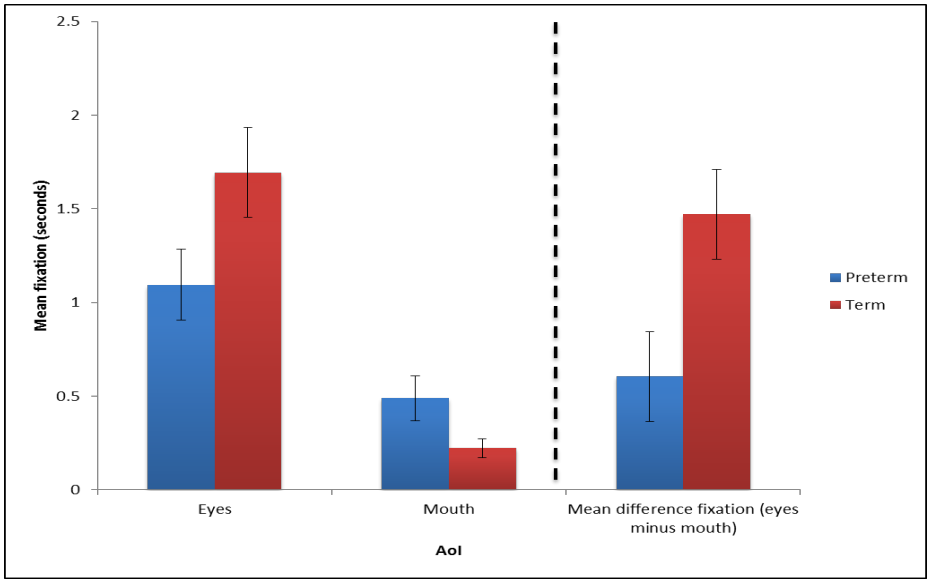
- Explore the early social cognitive phenotype associated with preterm birth
  - At risk group
  - Potential control group for ASD-siblings
- Insight into the domain specificity of early markers of social cognition

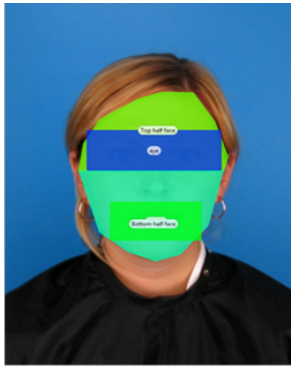
Social cognition tasks

Infants

Characteristic	Preterm (n=50)	Term (n=50)
PMA* at birth, weeks *Mean* *[range]*	29^{+1} [23^{+2} – 33^{+0}]	40^{+0} [38^{+1} – 42^{+1}]
Median age at testing, months [Inter-quartile range]	7.15 [6.67 – 8.8]	7.43 [6.87 – 9.34]
Gender male: female	22 : 28	26 : 24

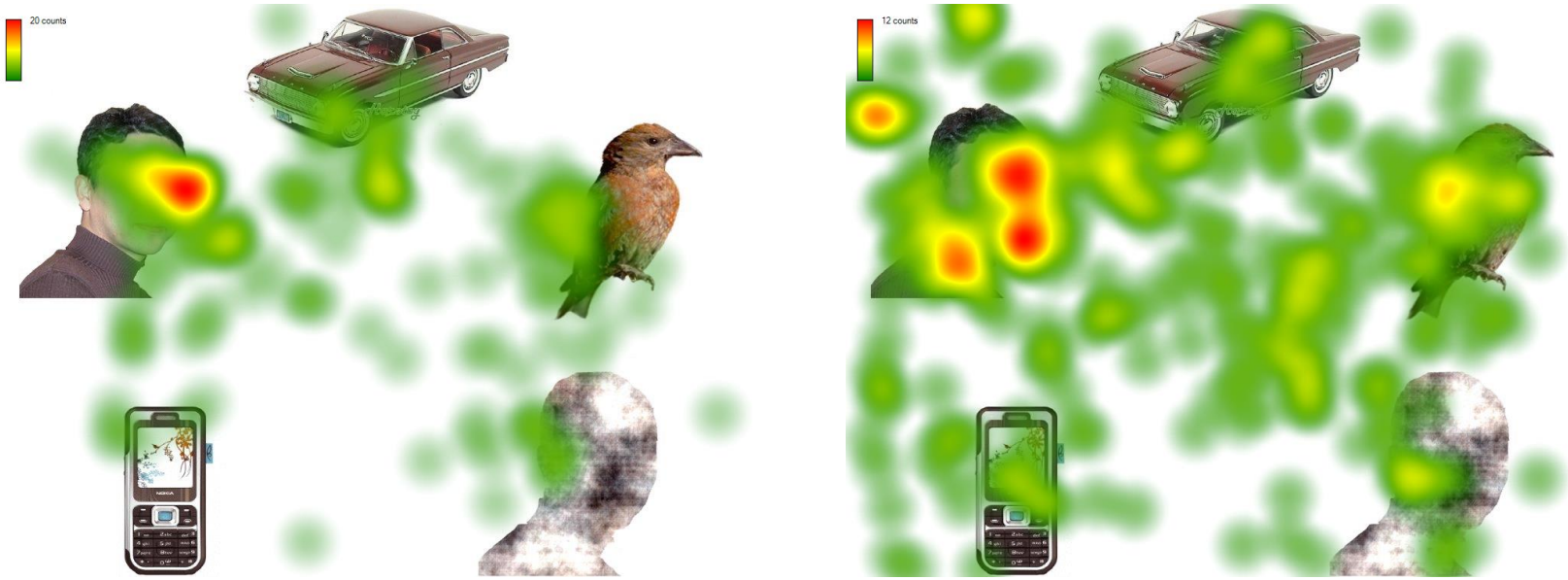
Results: face scanning





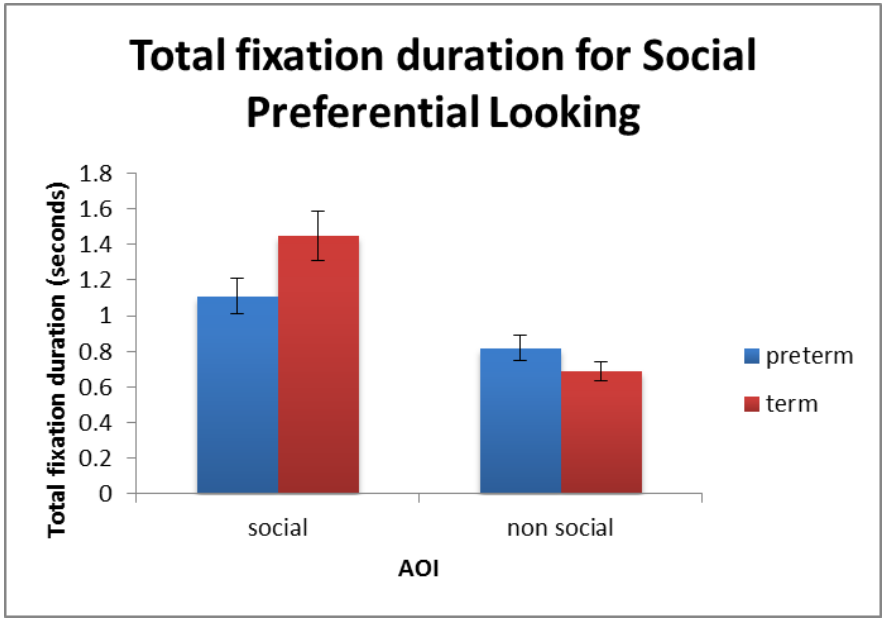
- Both groups fixate more on eyes, but preference smaller in preterms: mean difference 1.47 vs 0.61s, *p*= 0.012
- Terms also fixate on the eyes earlier than the mouth (2.34s vs 4.53s, *p*= .03), but preterms show no difference (3.18 vs 3.44s).

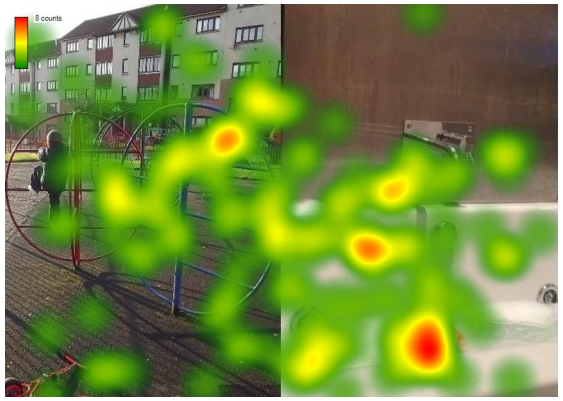
Results: pop-out



Term infants fixated significantly longer on the face then preterm infants (median 1.34s vs 0.8s, p=0.028).
No differences for other, non-social content.

Results: preferential looking





Fixation on social content > non-social for both groups, but this difference significantly smaller in preterms
(mean difference 0.76 vs 0.37, *p*= 0.013).

Interpretations

- Is it just attentiveness?
  - No differences in overall looking time to whole stimulus
  - No differences in first fixation latencies
  - Percentage looking-time score in preferential looking task results in significant group difference (term 54% vs prem 43%, *p*=.015)
- Is it driven by a sub-set of preterms?
  - No systematic differences in variability between groups
  - No evidence of outliers or sub-groups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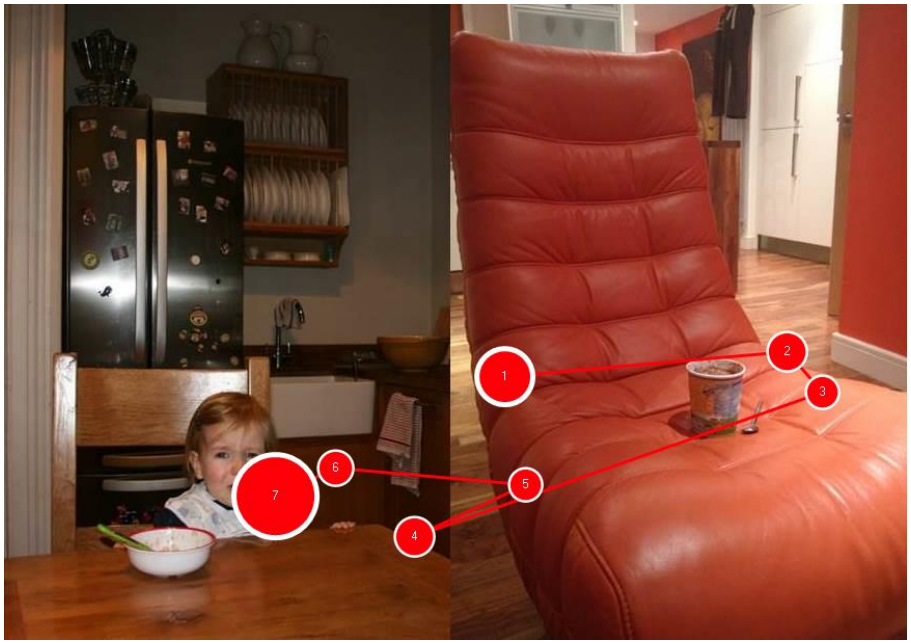
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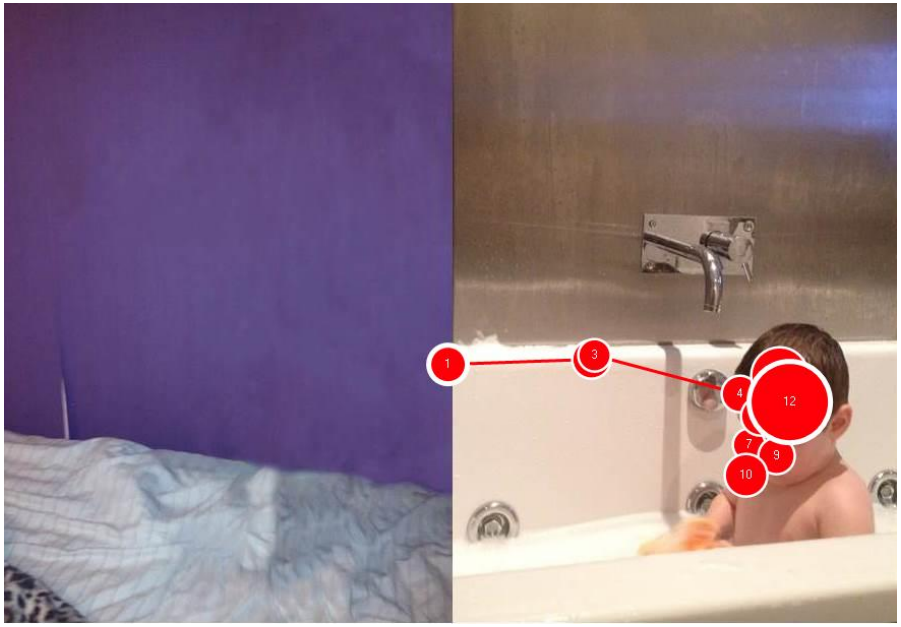
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Implications

- Preterm infants show an early social attention pattern previously thought to be associated with autism
  - Reflects general developmental delay?
  - Lack of social attention preference, or just distributed attention?
  - Effect of low-level stimulus features?
  - Stability over time?
- Consequences for early autism diagnosis
- Linking findings to neurological markers
  - Neonatal white matter development

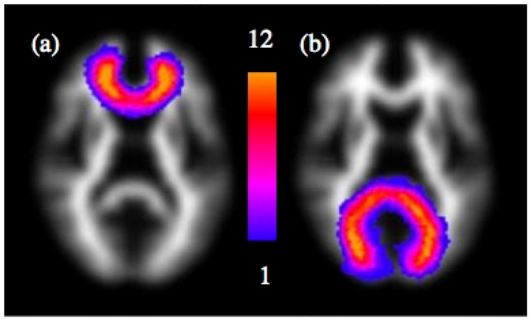

Figure 1. Group maps of (a) genu and (b) splenium generated by transforming the best match tract from each subject into MNI standard space and overlaying them as maximum intensity projections on an MNI white matter volume.

Thank you

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Theirworld

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